REMARKS

This amendment is responsive to the Office Action issued on May 30, 2002. Re-examination and re-consideration of claims 2-4 are respectfully requested. A marked-up copy of the claims is attached as an appendix.

THE OFFICE ACTION

Claim 1 has been rejected under U.S.C. §102(b) as being anticipated by Saji, et al. (Japanese document JP 60043060)

Claim 2 has been rejected under U.S.C. §103(a) as being unpatentable over Saji, et al. (Saji).

Claims 3 and 4 have been indicated as containing allowable subject matter.

THE CLAIMS DISTINGUISH OVER THE REFERENCES OF RECORD

Claim 2 now calls for the width of the S pole and the width of the N pole in each pair to be different from each other by a constant electrical angle ranging from 15 degrees to 50 degrees, nor that it be constant. Saji neither teaches, nor reasonably suggests that the electrical angle be between 15 and 50 degrees. Additionally, the applicant respectfully submits that the discovery of this particular limitation required more than ordinary skill in the art. A resulting wow and flutter (W/F) of the selected range was reduced to 3% or less. A smoother waveform also results from the selected range. Moreover, a clogging torque is reduced by implementing the selected angle. These benefits arose from experimentation and research that went above and beyond ordinary skill in the art. These facts are discussed on page 9 of the specification at lines 9-20 and illustrated in Fig. 7. Thus, applicants have found an

effective way to reduce a clogging torque of the motor, which is an object of the present invention, see page 2 of the specification at lines 9-12 and 21-27.

These benefits are not recognized by Saji. Rather, Saji proposes to solve a problem of a weak detent torque inherent in conventional PM type stepping motors. Saji's object is to heighten a coercive force acting between a rotor and a stator core of a motor. It is therefore respectfully submitted that **claim 2** distinguishes patentably and unobviously over the applied Saji patent, as well as the remaining references of record.

Claims 3 and **4** have been written in independent form to include the limitations of the base claim. It is therefore respectfully submitted that **claims 3** and **4** are now in condition for allowance.

CONCLUSION

For the reasons stated above, it is respectfully submitted that claims 2-4 distinguish patentably and unobviously of the references of record. Re-examination and early allowance of claims 2-4 are earnestly solicited.

Respectfully submitted,

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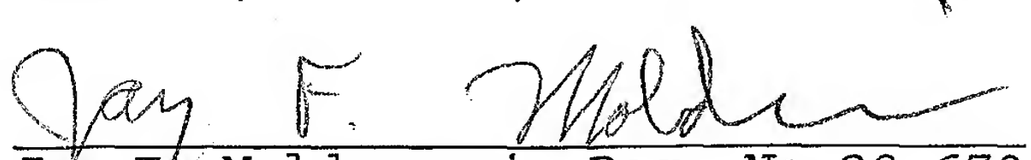

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APPENDIX

Version with markings to show changes made

IN THE CLAIMS:

2. (Amended) A [The] stepping motor [according to claim 1 or 2,] in which a stator unit is composed of a pair of stator sub-assemblies integrally attached to each other in a back to back manner, each stator sub-assembly having a plurality of pole teeth formed at its inner circumference and housing a coil inside thereof, and a rotor unit is rotatably disposed with a small gap from the plurality of pole teeth and has multiple magnetic poles formed on a circumference thereof, the multiple magnetic poles of the rotator unit being formed by magnetizing the rotator unit alternately with an S pole and an N pole in a circumferential direction, wherein while a magnetic pole width consisting [wherein the width] of the S pole and the width of the N pole in each pair are different from each other by a[n] constant electrical angle ranging from 15 degrees to 50 degrees.

3. (Twice Amended) A [The] stepping motor [according to claim 1,] comprising:

a stator unit comprising a pair of stator sub-assemblies integrally attached to each other in a back to back manner, each of the stator sub-assemblies including:

a plurality of pole teeth formed at an inner circumference of the sub-assembly and housing a coil inside thereof;

a rotor unit rotatably disposed with a small

gap from the plurality of pole teeth and has multiple magnetic poles formed on a circumference thereof, the multiple magnetic poles being formed by magnetizing the rotor unit alternately with an S pole and an N pole in a circumferential direction wherein one pair of the S pole and the N pole in which the width of the S pole is set to be smaller than the width of the N pole and another pair of the S pole and the N pole in which the width of the S pole is set to be larger than the width of the N pole are alternately arranged.

4. (Amended) A [The] stepping motor [according to claim 1,] comprising:

a stator unit comprising a pair of stator sub-assemblies integrally attached to each other in a back to back manner, each of the stator sub-assemblies including:

a plurality of pole teeth formed at an inner circumference of the sub-assembly and housing a coil inside thereof;

a rotor unit rotatably disposed with a small gap from the plurality of pole teeth and has multiple magnetic poles formed on a circumference thereof, the multiple magnetic poles being formed by magnetizing the rotor unit alternately with an S pole and an N pole in a circumferential direction wherein one pair of the S pole and the N pole in which the width of the S pole is set to be smaller than the width of the N pole and another pair of the S pole and the N pole in

which the width of the n pole are alternately arranged.